



## Intestinal adenocarcinoma causing recurrent colic in the horse

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**Abstract** — An 8-year-old, Thoroughbred-cross mare presented with recurrent colic. Exploratory laparotomy revealed a large mass near the right dorsal colon; white, raised foci on the liver; and enlarged mesenteric lymph nodes. Cytological examination of biopsies revealed neoplastic cells. The diagnosis of adenocarcinoma was confirmed by histological examination.

**Résumé** — Adénocarcinome intestinal à l'origine de coliques récurrentes chez un cheval. Une jument Thoroughbred croisée de 8 ans a été présentée avec des coliques récurrentes. Une laparotomie exploratrice a révélé une masse importante près du colon dorsal droit, des points blancs surélevés sur le foie et des ganglions lymphatiques mésentériques hypertrophiés. L'examen cytologique des biopsies a révélé des cellules néoplasiques. Le diagnostic d'adénocarcinome a été confirmé à l'examen histologique.

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An 8-year-old Thoroughbred mare presented with recurrent colic over a 2-month period. The referring veterinarian had examined the mare twice for episodes of colic. The first episode, 6 wk prior to presentation, was successfully controlled with the antispasmodic, dipyrone (Dipyrone 50%, Austin, Joliette, Quebec), 5 mg/kg body weight (BW), IV; and mineral oil (mineral oil, Austin), 4 L; and dioctyl sodium succinate (Dioctol, rogar/STB, London, Ontario), 10 mg/kg BW, via stomach tube. The second episode was treated in a similar manner; however, the mare's discomfort was only partially and temporarily alleviated. Previous examinations had revealed that temperature, pulse, and respiration were within normal ranges. The only clinical abnormalities were colic and variably decreased to increased intestinal sounds. At the time of referral, the mare had a decreased appetite and had not been drinking well for the last 2 d. The owner also reported that the mare appeared to have lost weight and that the feces were scant and firmer than normal. Abdominal discomfort was progressive and no longer responded to treatment.

The mare was depressed, but her temperature, heart rate, and respiratory rate were within normal reference ranges. Intestinal sounds were variable, being increased, decreased, or absent in any of the 4 quadrants at a given time. Transrectal examination revealed a moderately distended cecum and colon. Abdominocentesis produced approximately 2.5 mL of a cloudy yellow fluid.

Cytologic examination of this fluid revealed nucleated cells ( $6.3 \times 10^9/L$ ) and red blood cells ( $0.02 \times 10^{12}/L$ ). Total protein was 19 g/L and specific gravity was 1.016. The nucleated cells consisted of macrophages, non-degenerate neutrophils, and large, reactive mesothelial cells. Leukophagia and erythrophagia were present, but no bacteria or neoplastic cells were found. The abdominal fluid was a modified transudate.

A complete blood cell count, serum chemical analysis, and urinalysis were completed. The only abnormal findings were a decreased serum calcium (2.79 mmol/L, normal) and decreased serum phosphorus (0.82 mmol/L, normal), which were attributed to decreased dietary intake, and slightly increased serum glucose (6.1 mmol/L, normal), which was likely due to stress. The mare was treated with 0.5 mg/kg BW of flunixin meglumine (Banamine, Schering-Plough, Pointe-Claire, Quebec), IV, which decreased the signs of abdominal discomfort. The mare was observed overnight.

Next day, the mare was still showing signs of intermittent abdominal pain. Intestinal sounds continued to be variable and there was marked flatulence. Another transrectal examination revealed a distended mass on the right, cranial to the cecum. The temperature, pulse, and respiration did not exceed reference ranges. Again, the mare was monitored overnight and treated with flunixin meglumine, as needed, for pain.

The following day, the mare showed increased signs of discomfort, though her temperature, pulse, and respiration had not changed. An exploratory laparotomy was recommended. A mass was found in the region of the right dorsal colon, proximal to the diaphragmatic flexure, and the mesenteric lymph nodes were enlarged. The liver had numerous white, raised foci. Biopsies of the intestinal mass, liver, and a mesenteric lymph node were submitted for immediate cytologic examination,

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which revealed neoplastic cells in all 3 samples. A tentative diagnosis of metastatic adenocarcinoma was made. The owners requested euthanasia.

Postmortem examination confirmed a firm mass, varying from 2- to 8-cm thick, in the wall of the dorsal colon close to the diaphragmatic flexure. This mass extended 15 cm along the length of the colon and approximately 15 cm around the circumference of the colon. The lumen of the colon was reduced to 1 to 2 cm by the mass. On cross section, the mass was white and gritty. The colonic mucosa was ulcerated and contained necrotic debris. The mesentery also contained a mass (3 cm × 10 cm) of similar tough, white material. The colonic lymph nodes were enlarged, and some contained foci of white, gritty material. The liver contained coalescing, firm, white foci, ranging from 2 to 20 cm in diameter, on the surface and throughout the parenchyma. Hepatic lymph nodes were also enlarged and contained firm, white foci.

Cytologic examination of the intestinal mass, liver, and lymph nodes revealed large cells in singlets, clumps, or discrete acini. These cells displayed numerous characteristics of malignancy, including anisocytosis; large, hyperchromic nuclei with varied chromatin pattern and prominent, irregular, and numerous nucleoli; and numerous mitotic figures were evident.

Histological examination revealed dense fibrous tissue surrounding clusters of the neoplastic cells arranged in acini. There were numerous foci surrounded by bone. The mesenteric lymph nodes and liver contained similar foci of neoplastic cells.

The diagnosis was adenocarcinoma of the dorsal colon with osseous metaplasia and metastasis to liver and lymphoid tissue.

Intestinal neoplasms are rare in the horse. The most commonly reported forms of intestinal neoplasia are lymphosarcoma and squamous cell carcinoma (1). Only 2 of 12 horses with intraabdominal neoplasia were reported with adenocarcinoma (2). Intestinal adenocarcinomas cause a variety of clinical signs, including weight loss, exercise intolerance, edema, anorexia, lethargy, fever, and recurrent colic (2–4).

Adenocarcinoma should be considered in horses presented for recurrent colic, once other etiologies have been excluded. Surgical exploration or postmortem examination are often required to confirm a diagnosis (5).

Intestinal adenocarcinoma can present with a variety of clinical pictures, including intermittent abdominal pain (1,6,7), a singular episode of colic (3), chronic weight loss (3,7), soft feces or diarrhea (3,4), severe dependent edema, and exercise intolerance due to hypoproteinemia

(2) or anemia (3). This horse presented with scant, dry feces, which is consistent with incomplete obstruction of the colon (8). Cardiovascular parameters are often normal with partial colonic obstruction, unless ischemic damage occurs to the intestinal wall (4,6,9). Increasing severity and frequency of colic occurs as a result of increasing size of the neoplasm and further obstruction of the intestinal lumen (1,6,7).

The pathologic findings in this case were similar to those in other reports. For example, ulceration is common with intestinal neoplasia (1,6,7) and osseous metaplasia has also been reported (3,7). Also, metastasis has been reported and commonly occurs via the lymphatics to mesenteric lymph nodes and liver (4,6,7).

Laparoscopy is an alternative to exploratory surgery for visualizing neoplasms and obtaining biopsies (4). In this case, exploratory surgery was chosen in preference to laparoscopy to ensure maximum visualization of the abdomen and to provide the option of surgical treatment pending diagnosis.

Surgical resection and anastomosis has been reported in a case of small intestinal adenocarcinoma in the horse (6). Given the metastases noted in our case, resection and anastomosis were not attempted.

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